American basswood

Tilia americana

Basswood is a fast-growing species and an important component of the maple-basswood forest type. The **volume of basswood has increased** since 1983. In the last 10 years, **growth rates have increased** and **mortality has decreased.** In 2008, basswood accounted for 5.4% of all volume in Wisconsin, but only 2.2% of total mortality and 4.5% of growth.

Basswood is **not an important timber species**, accounting for only 1.2% of roundwood produced. Currently, we harvest less than half of total growth. The density of basswood is the lowest of all hardwood species which may make it less desirable for biofuel production.

- *How has the basswood resource changed?*
  Growing stock volume and diameter class distribution: 1983, 1996, and 2008
- *Where does basswood grow in Wisconsin?*
  Growing stock volume by region with map
- *How fast is basswood growing?*
  Average annual net growth by region and year: 1983, 1996, and 2008
- *How healthy is basswood in Wisconsin?*
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- *How much is basswood selling for?*
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- *How much basswood biomass do we have?*
  Oven-dry tons by region of the state: 2008

"How has the basswood resource changed?"

Growing stock volume and diameter class distribution by year

The growing stock volume of basswood in 2008 was about 1.1 billion cft or over 5.4% of total statewide volume (Chart 1). Volume has increased 35% since 1983 but has changed little since 1996.

The **basswood resource has aged** in the last 23 years. For instance, the volume in large trees (over 13 inches in diameter) has doubled since 1983 while the volume in smaller trees has not changed (Chart 2).

In the last ten years, however, the number of seedlings and poles has fallen (Chart 3), suggesting a possible decrease in future populations of basswood.

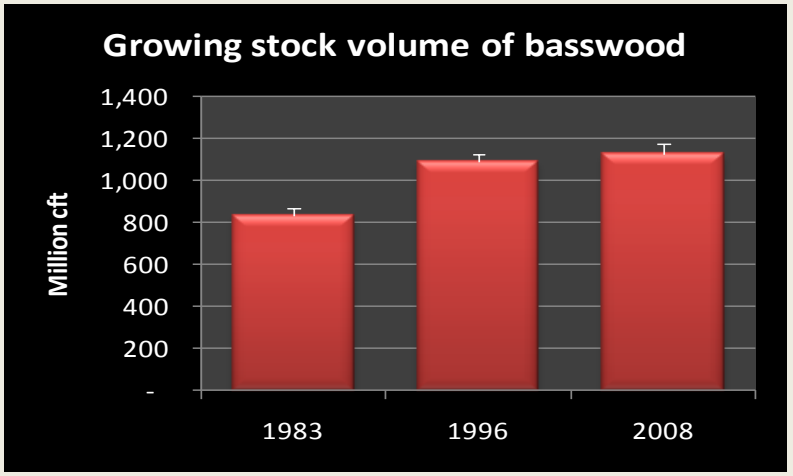


Chart 1. Growing stock volume (million cubic feet) by inventory year.
Source: USDA Forest Inventory and Analysis data: 1983, 1996, and 2008.

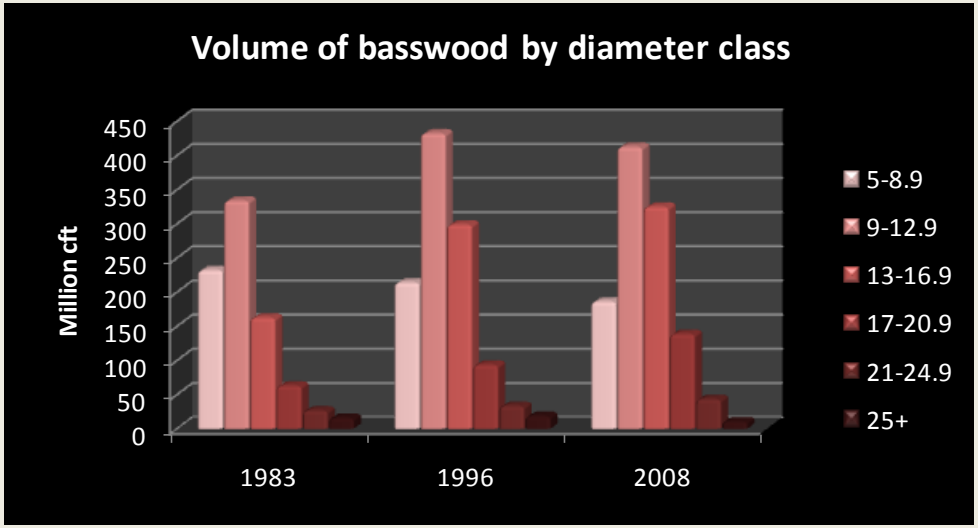


Chart 2. Growing stock volume (million cubic feet) in 1983, 1996, and 2008.
Source: USDA Forest Inventory and Analysis data: 1983, 1996, and 2008.

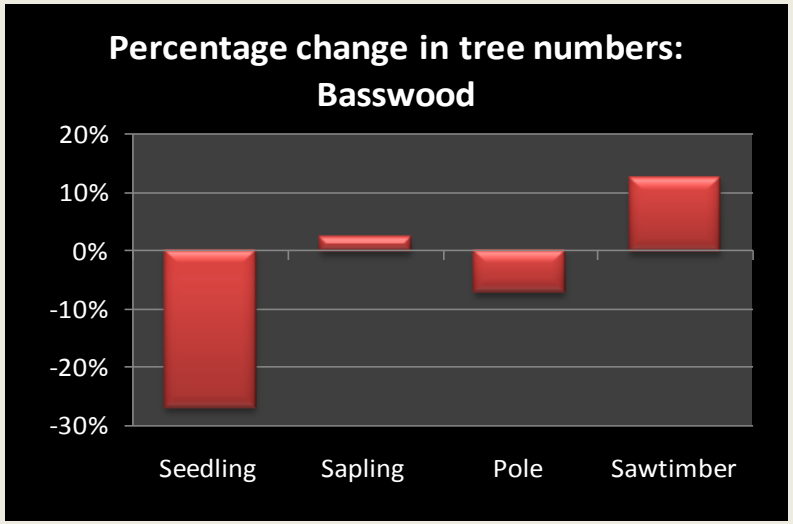
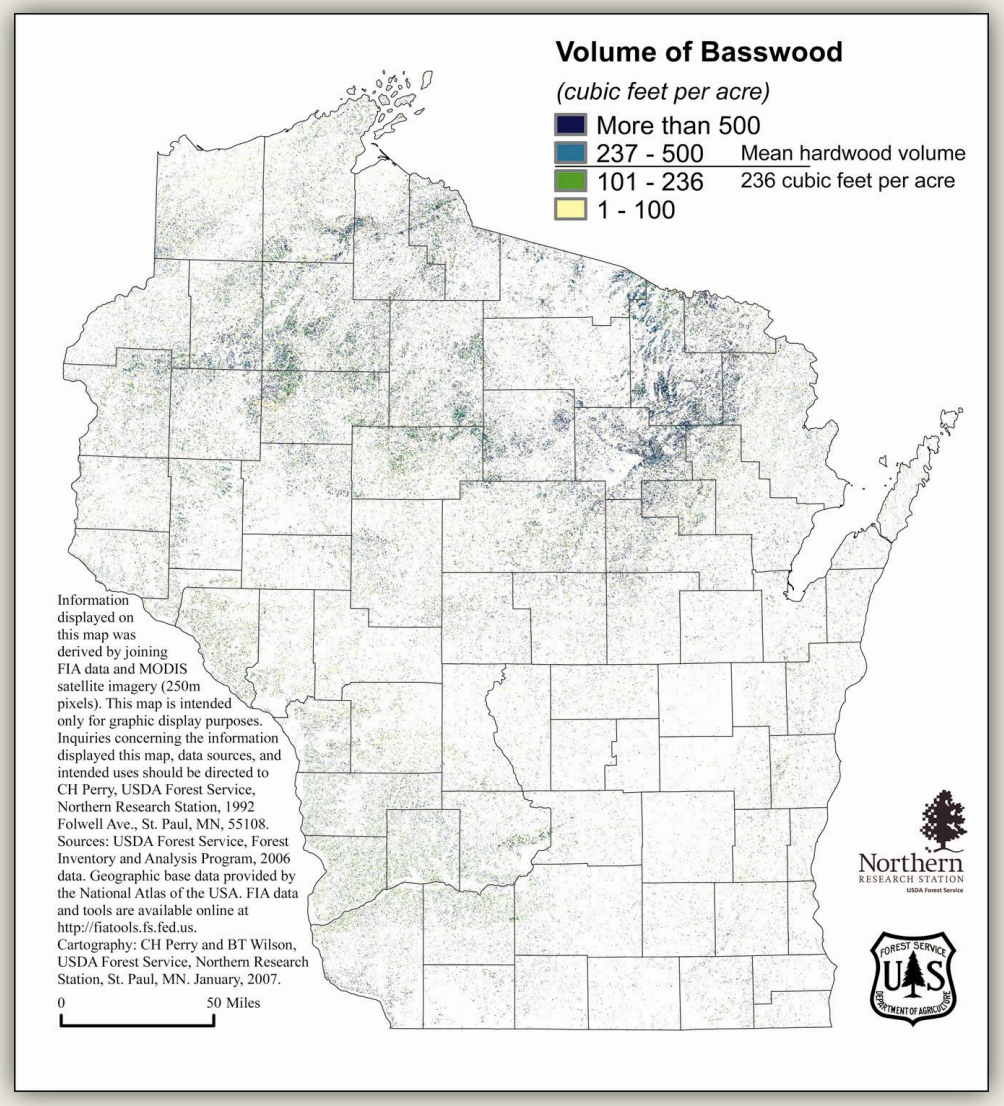


Chart 3. Percentage change in the number of live trees by size class between 1996 and 2008.
Source: USDA Forest Inventory and Analysis data 1996, and 2008.

"Where does basswood grow in Wisconsin?"

Growing stock volume by region with map



About two thirds of all basswood volume is located in northern Wisconsin with another one quarter in the central and southwest parts of the state.

Basswood is found mostly in maple-basswood forests and, to a lesser extent, in oak-hickory.

Table 1. Growing stock volume (million cft) by species and region of the state.

Species	Central	North east	North west	South east	South west	Total
Basswood	124	358	388	92	166	1,128
Percent of total	**11%**	**32%**	**34%**	**8%**	**15%**	**100%**

Source: USDA Forest Service, Forest Inventory and Analysis 2008 data

Additional tables:

Volume by county in 2008 (pdf; Excel)

"How fast is basswood growing?"

Average annual net growth by region and year

Average annual net growth, about 26 million cft per year, accounts for 4.5% of total statewide growth (Chart 4). The growth rate has increased by 29% since 1996.

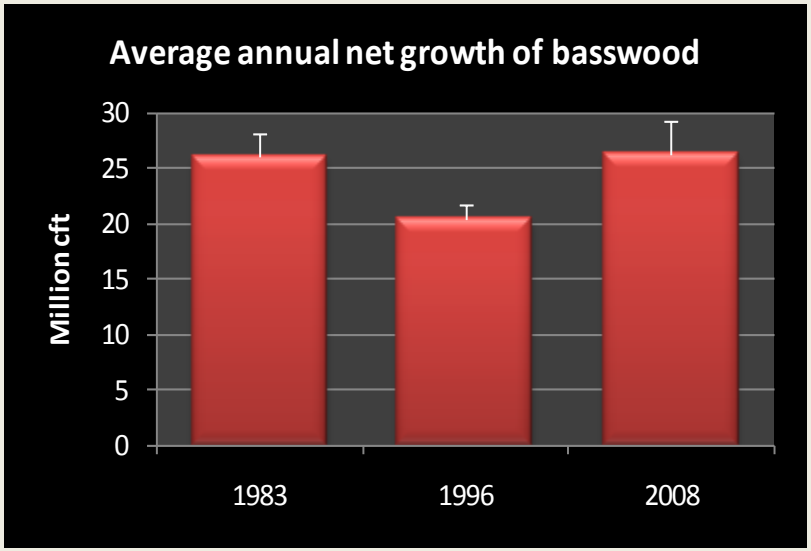


Chart 4. Average annual net growth (million cubic feet).
Source: USDA Forest Inventory & Analysis data: 1983, 1996, 2008

Table 2. Average annual net growth (million cft/year) and ratio of growth to volume by region of the state.

Region	Net growth	Percent of Total	Ratio of growth to volume
Central	3.1	12%	2.5%
Northeast	6.3	24%	1.8%
Northwest	6.7	26%	1.7%
Southeast	4.1	15%	4.4%
Southwest	6.1	23%	3.7%
Statewide	**26.3**	**100%**	**2.3%**

Source: USDA Forest Inventory and Analysis 2008.

The highest volume growth for basswood is in the northern part of the state but the highest rates of growth to volume are in southern Wisconsin (Table 2).

The average ratio of net growth to volume for basswood is 2.3%, **lower than the statewide average** of 2.8% for all species.

Additional tables:
Average annual growth, mortality and removals by region (Pdf, Excel).

"How healthy is basswood in Wisconsin?"

Average annual mortality: 1983, 1996 and 2008

Average annual mortality of basswood from 2004 to 2008 was about 4.4 million cft, or 2.2% of statewide mortality (Chart 5). This rate has decreased significantly since 1996.

The ratio of mortality to gross growth is about 14% for basswood (Table 3). This is **significantly lower than the average** for all species in Wisconsin which is 26%.

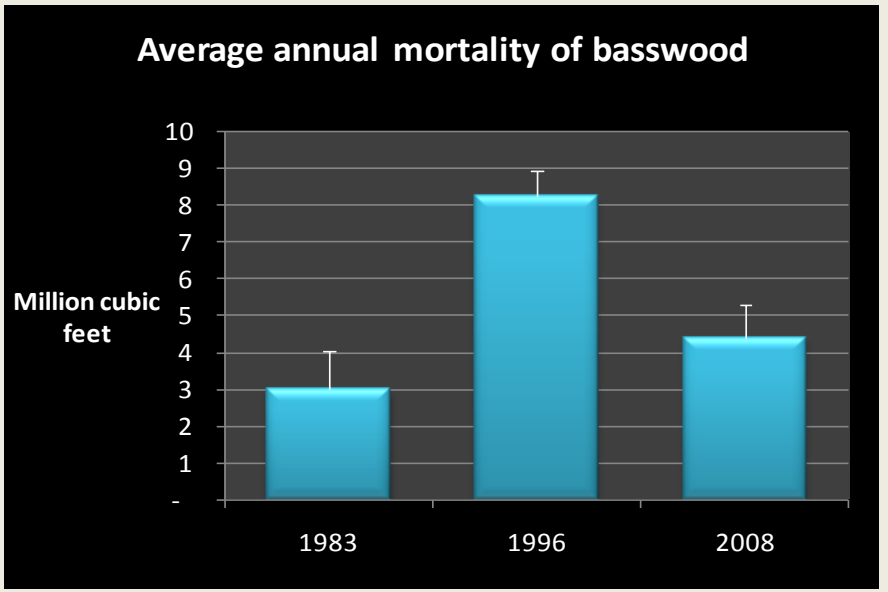


Chart 5. Average annual mortality (million cubic feet) by inventory year.
Source: USDA Forest Inventory & Analysis data: 1983, 1996, 2008

Table 3. Mortality, gross growth, and the ratio of mortality to gross growth.

Species	Average annual mortality (cft)	Average annual gross growth (cft)	Mortality / growth
American Basswood	4,407,630	30,686,967	**14%**

Additional tables:
Average annual growth, mortality and removals by region (Pdf, Excel).

"How much basswood do we harvest?"

Roundwood production by product and year

In 2003, Wisconsin produced about 11.3 million cft of basswood roundwood, or about 3% of the total harvest (Chart 6). Pulpwood and sawlogs each accounted for about 40% and composites for 12%.

Between 2003 and 2006, pulpwood production dropped 3.6 million cft or 69%. Production of composite products accounts for almost 5.5% of total state production.

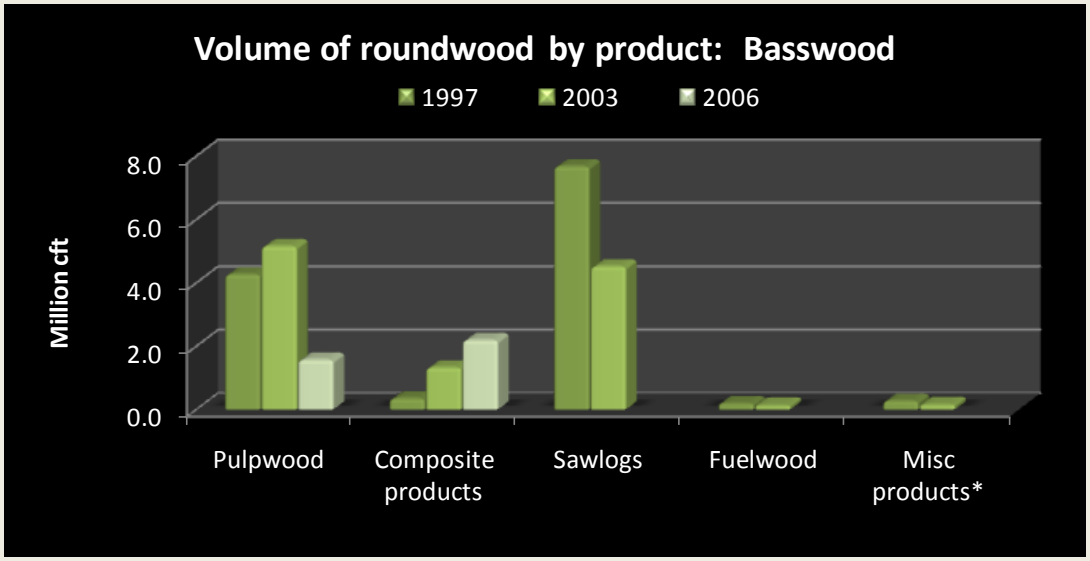


Chart 6. Volume of roundwood products. Numbers for pulpwood and composite products are from 2006. Numbers for sawlogs, fuelwood and miscellaneous products are from 2003 (Ron Piva).
* Miscellaneous products include poles, posts, pilings and veneer.
Source: Timber Products Output Mapmaker, http://ncrs2.fs.fed.us/4801/fiadb/rpa_tpo/wc_rpa_tpo.ASP

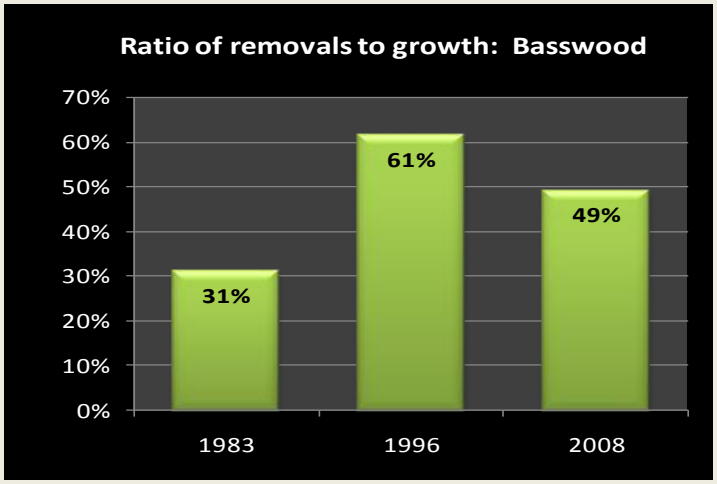


Chart 7. Ratio of volume harvested annually to net growth.
Source: USDA Forest Inventory & Analysis data: 1983, 1996, 2008.

The ratio of removals to growth is 49% for basswood, lower than the statewide average ratio of 59% (Chart 7). Whereas basswood accounts for 5.4% of growing stock volume in the state, it makes up less than 4% of removals.

Additional tables:
Average annual growth, mortality and removals by region (Pdf, Excel).

"How much is basswood selling for?"

Prices for cordwood and sawtimber: 2000 to present

Due to the variability of timber prices from year to year and region to region, two methods of reporting prices are presented here: Timber Mart North and the weighted average stumpage prices from Wisconsin Administrative Code Chapter NR 46.

Stumpage prices for both pulpwood and sawtimber, as reported in the Timber Mart North (Chart 8), have decreased steadily since 2004: by 57% for sawtimber stumpage and by 73% for pulpwood. Delivered pulpwood, on the other hand, has actually increased in price since 2000.

Average weighted stumpage values, as reported in NR46, have decreased since 2006 (Table 4).

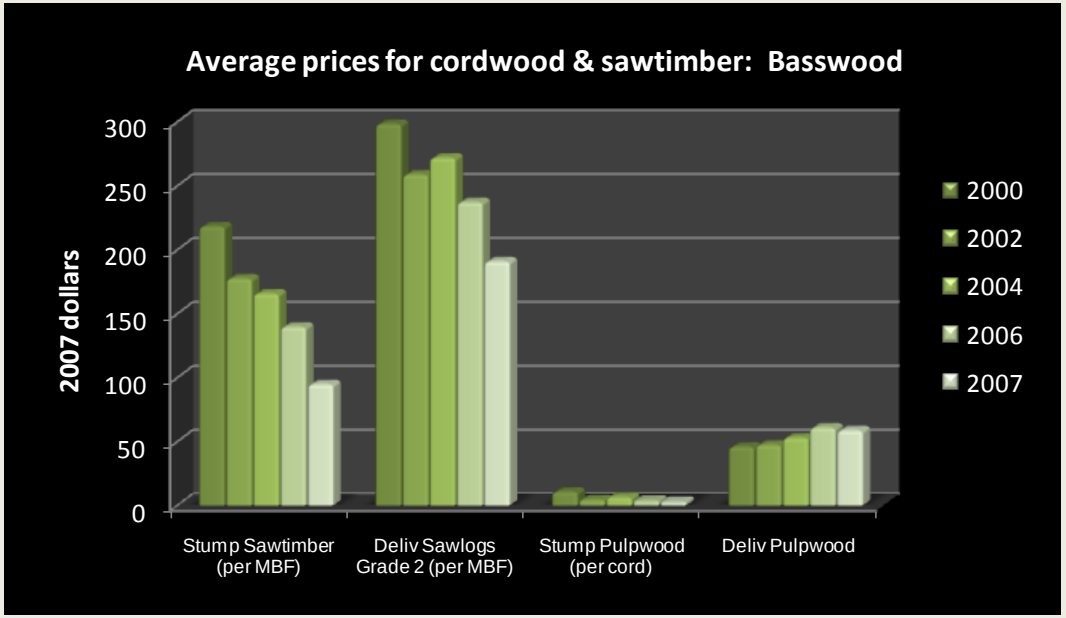
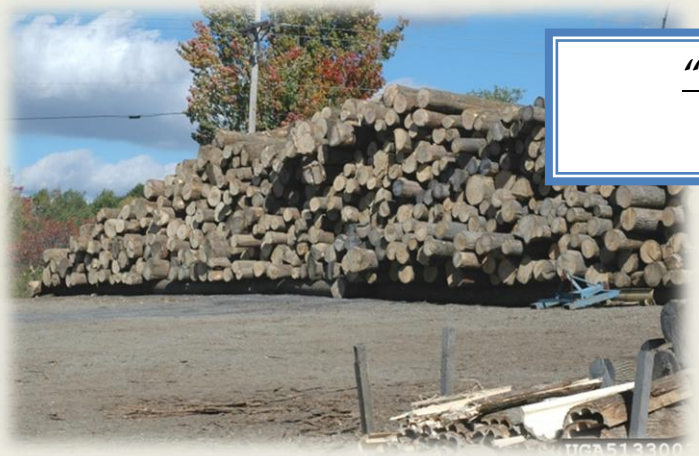


Chart 8. Average prices for cordwood and sawtimber (2007).
Source: Timber Mart North, George Banzhaf & Company, 8301 N. Allen Lane, Milwaukee, WI 53217

Table 4. Average weighted stumpage prices (adjusted for inflation to 2009 dollars) by year for Wisconsin.

Product	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average for all hardwoods
Cordwood (per cord)	$5	$5	$6	$7	$9	$15	$18	$12	$7	**$8**	$19
Logs (per MBF)	$208	$204	$183	$158	$193	$190	$215	$189	$130	**$135**	$140

Source: Wisconsin Administrative Code Chapter NR46, 2000 to 2008



"How much basswood biomass do we have?"

Oven-dry tons by region of the state

There were 20.2 million oven-dry tons (ODT) of basswood biomass in 2008, a decrease of 2.5 million ODT or 11%, from 1996. This species represents 3.4% of all live biomass statewide. As with volume, most basswood is located in northern Wisconsin (Chart 9).

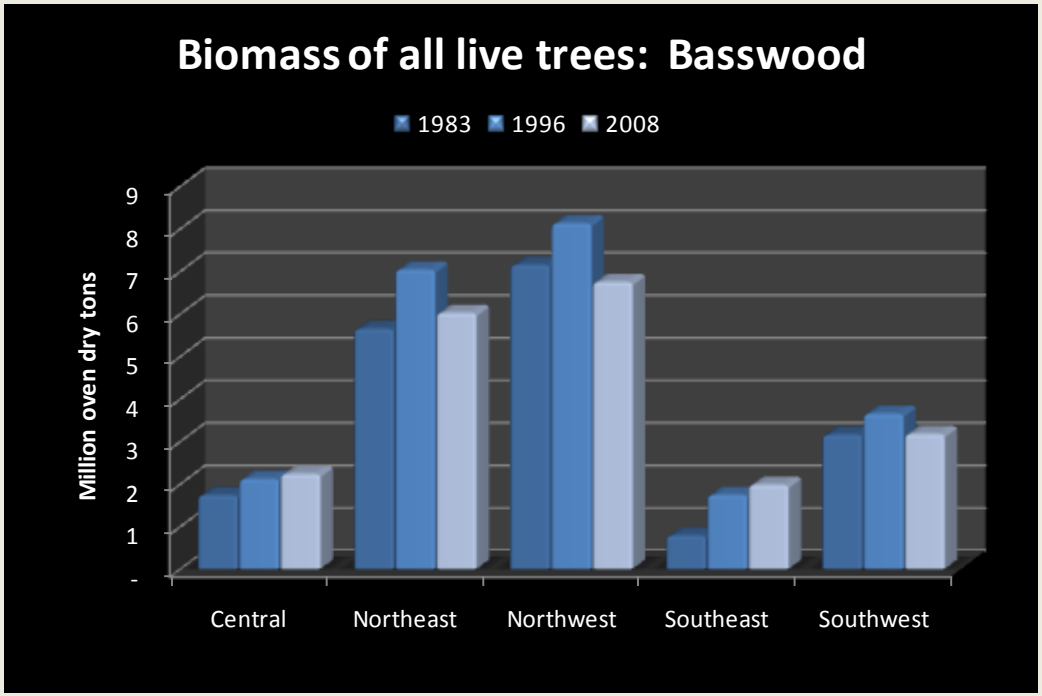


Chart 9. Biomass (million oven-dry tons) by year and region.
Source: USDA Forest Inventory & Analysis data: 1983, 1996, and 2008

Basswood has the lowest density of any of the commercial hardwood species in Wisconsin, with a ratio of biomass to volume of 32.1 oven-dry pounds per cubic foot (ODP/cft). The average for all hardwoods is about 50.1 ODP/cft and for all trees is 46.8 ODP/cft. Approximately 75% of basswood biomass is located in the main stem and 21% in the branches.

Additional tables:
Biomass by county in 2008 (pdf; Excel)